



Correlation of pre-exam stress, anxiety, and depression among paramedical students-A cross-sectional study

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Abstract

Background: -The mental health of college/university going students is an area of increasing Concern worldwide. The objective of this study is to examine the prevalence of depression, anxiety and stress among the students before examination in paramedical students.

Method: -This research investigates the prevalence of pre-exam stress, anxiety, and depression among paramedical students, identifies relevant factors, and offers management and intervention techniques. This study highlights the need for enhanced awareness and support mechanisms inside educational institutions. Descriptive cross-sectional study was conducted among undergraduate and postgraduate paramedical students. Total duration of study was 6 months. Data was collected from 128 students. Modified standardized stress, anxiety and depression scales (using Google form) was used to collect data and result was analyzed using its severity rating index. Data was entered and analyses by using JAMOVI version 2.3.28. Significance level was set at $p \leq 0.05$.

Result: -The mean average age of the 128 respondents in the data is 21 years old. Stress: With values ranging from 1 to 5, the average mean value of stress level is 2.98. Anxiety: On a scale of 1 to 5, the average anxiety level is 2.59. Depression: With scores ranging from 0 to 3, the average depression score is 0.73. For, validity analysis normality was checked and data were not normally distributed so, spearman's correlation test was applied and which suggest that there is positive correlation.

Conclusion: - This study concludes that there is moderate positive correlation between Stress and Anxiety in paramedical students before examination. There is moderate positive correlation between Anxiety and Depression in paramedical students before examination. There is low positive correlation between Stress and Depression in paramedical students before examination.

Keywords: Stress, anxiety, depression, paramedical students, pre-exam

Introduction

The paramedical field is an essential part of healthcare, providing vital diagnostic, therapeutic, and support services which has a wide range of specialized areas, including medical laboratory technology, radiology, physiotherapy, emergency medical services, and nursing. These professionals work alongside doctors and healthcare teams to ensure accurate diagnosis, effective treatment, and quality patient care. Courses in the Paramedical Field -Undergraduate (UG) Courses. Students interested in paramedical sciences can pursue Diploma programs (1–2 years) or Bachelor's degrees (B.Sc.) (3– 4 years). Common UG programs include: B.Sc. in Medical Laboratory Technology (MLT)– Focuses on diagnostic testing, pathology, and laboratory procedures. in Radiology & Imaging Technology– Covers X-rays, MRIs, CT scans, and other imaging techniques. Bachelor of Physiotherapy (BPT)– Deals with rehabilitation, physical therapy, and mobility improvements. Nursing– Prepares students for patient care, medical procedures, and healthcare management.

Postgraduate (PG) Courses -PG programs, typically spanning 2 years, allow students to specialize further in their chosen field. These include: M.Sc. in Medical Imaging Technology– Advanced training in radiology and imaging sciences. Master of Physiotherapy (MPT)– Specialization in orthopedic, neurological, or sports physiotherapies and in

Nursing – Focuses on advanced clinical skills, research, and healthcare leadership.

Challenges Faced by Students- Academic competitions and technical knowledge. -Paramedical courses are challenging due to their large syllabus, which includes anatomy, physiology, pathology, pharmacology, and specialized medical procedures. Nursing, in particular, demands more of practical training, patient management, and emergency care skills, making it both physically and mentally demanding.

Language Barriers -Many students, especially those from non-English-speaking backgrounds, struggle with medical terminology and technical subjects, as most UG and PG courses are taught in English. This can impact their ability to grasp theoretical concepts, communicate effectively in clinical settings, and perform well in exams. To overcome these challenges, institutions often provide language support, preparatory courses, and hands-on training to help students adapt. Despite these challenges, a career in paramedical sciences is rewarding, offering diverse opportunities in hospitals, research, and specialized healthcare services.

Stress is a state of psychological and physiological stress resulting from disparity between situational demand and the individual's ability and capacity to meet those needs. It is response of the body that may be physical, mental or emotional to an unforeseen event that occurs in the life of an

individual. ^[1] An extreme amount or negative feeling of stress can have health consequences & adversely affect the immune, cardiovascular, neuroendocrine & central nervous systems ^[2, 3]

Stress & anxiety goes hand in hand as anxiety is a response to the stress in times of threat ^[4]. Academic stresses develop the competition and motivation among students and encourage learning. However, sometimes this stress produces anxiety and feelings of helplessness, leading to stress-related disorders and adversely affecting academic and non-academic performance. ^[5]

Depression is seen by persistent sadness and a lack of interest or pleasure in previously rewarding or enjoyable activities. It is very important to identify the factors predisposing to depression among paramedical students. The main objective of this study was to assess the prevalence of depression and the factors associated with depression among the paramedical students. ^[6] In addition to academic pressures, exposure to traumatic experiences during training can also contribute to mental health issues. Research indicates that paramedic trainees frequently encounter traumatic situations, which can lead to post-traumatic stress disorder (PTSD) and other psychological disturbances ^[7, 8]. For instance, a study by McKinnon *et al.* highlighted that student with higher levels of trauma exposure exhibited increased symptoms of PTSD, depression, and stress. ^[9]

The lack of social support and resilience among paramedic students can exacerbate their mental health challenges. Studies have shown that low levels of social support correlate with higher levels of stress and depression, indicating that fostering a supportive environment is crucial for the well-being of these students. ^[10] peer support mechanisms have been suggested as potential interventions to mitigate stress and improve mental health outcomes among paramedic students. ^[11]

Aims of the study

The aim of this study was to know the prevalence of pre-exam Stress, Anxiety and Depression among Paramedical students and to check the Correlation between pre-exam Stress, Anxiety and Depression among paramedical students.

Objective of the study

The objective for this study is to find the correlation between stress, anxiety and depression before examination in paramedical students and influence on psychological behavior in paramedical students. The objective of the study is very clear that medical students remain under sturdy pressure throughout their academic course. These findings will emphasise the need for greater attention to the psychological well-being of students under medical training. Nowadays, there is an increase in the stress of students before examinations. Physical activity is decreasing and on the other hand there is increasing stress, anxiety and depression in students either for the study or before examination. The prevalence of stress, anxiety and depression has been over peak in the last decade; its association with examination and study. The problem of the potential health risk applies particularly to young people who are prone to stress and anxiety. Sedentary behaviors, overthinking, panic attacks in college students are largely due to increased competition. Hence, it was necessary to

find out that stress, anxiety and depression before an examination is increasing or not.

Materials and Methodology of This Study

The study design is cross-sectional study. The study population of this study is undergraduate paramedical students. Sampling technique was a google form and Study duration is of 6 months. Initially, 100 subjects were selected from 17 to 24 years of age group, depending upon the inclusion and exclusion criteria. Study was conducted in the SPB Physiotherapy College and Vatsalya Nursing and Research Institute.

Inclusion criteria

Normal healthy subjects who fulfilled the following criteria were included in the study: age between 18 years and 25 years; subjects willing to complete Willing to participate.

Exclusion criteria

Participants having any psychological history or risk causing or at risk were excluded from the study like history of any neuropsychiatric illness. Refuse to participate. The Scales were Modified according to the question correlated with before examination scenarios.

Scales

Academic stress scale

- The study aimed to translate, adapt, and verify the content validity and internal consistency of the Perceptions of Academic Stress Scale (PAS) to measure university students' perceptions of academic stress and its sources ^[12].
- Key academic stressors identified for college students included final grades, excessive homework, exams, and studying. ^[12]
- In this study, we have taken only five questions from the scale that specifically focus on the pre-examination scenario. Scores are usually interpreted within a range, where specific thresholds (e.g., low, moderate, high) are determined based on sample data and statistical analysis.

Westside test anxiety scale

- Test anxiety is commonly observed during exams, particularly in situations where students are under pressure to perform well.
- The WTAS is a ten-item instrument used to identify students with anxiety impairments who could benefit from interventions. It measures self-assessed anxiety and cognitive impairments affecting performance. ^[13]
- In this study, we have taken only five questions from the scale that specifically focus on the pre-examination scenario Test anxiety, especially during exams, can affect academic progress and career prospects.
- The study found that low test anxiety scores were below 1.9, and high anxiety scores were between 2.5 and 2.9. Scores from 3.0 to 3.4 fall into the category of moderately high-test anxiety. scores between 3.5 and 3.9 indicates intense high-test anxiety. Lastly, scores from 4.0 to 5.0 are classified as extremely high-test anxiety. ^[13]
- The 0.44 validity coefficient of the Westside Test Anxiety Scale (WTAS) is considered high, largely due to its focus on both cognitive interference and

impairment, addressing the key factors of test anxiety. Using change scores for validation (instead of stationary scores) improved the correlation between reduced anxiety and performance gains, confirming the scale's reliability and validity in measuring test-anxiety impairment.^[13]

Beck's depression inventory:

- The Beck Depression Inventory (BDI) is one of the most widely used screening instruments for measuring the severity of depression in both adults and adolescents over the age of 13.^[14]
- Contains 21 items and identifies symptoms and attitudes associated with depression. The respondent must recall the relevance of each statement for today: mood, pessimism, sense of failure, lack of satisfaction, guilt, sense of punishment, self-hate, self-accusations, self-punitive wishes, crying spells, irritability, social withdrawal, indecisiveness, body image, work inhibition, sleep disturbance, that evaluates symptoms such as sadness, pessimism & worthlessness.^[14]
- The Beck Depression Inventory (BDI) uses a 0-3 scale for each item, with a total score ranging from 0 to 63. Scores of 0-10 indicate minimal depression, 10-18 suggests mild to moderate depression, 19-29 reflects moderate depression, and 30-63 represents severe depression. These scores help assess the severity of depression. In this study, we have taken only five questions from the scale that specifically focus on the pre-examination scenario especially during exams, can affect academic progress and career prospects.^[14]
- The Beck Depression Inventory--II was validated in adolescent psychiatric inpatients, with good content validity and reliability estimates. The BDI demonstrates good internal consistency, with Cronbach's alpha values typically ranging from 0.80 to 0.92 across different populations. This indicates that the items within the scale are consistently measuring the same construct of depression.^[14]
- The test-retest reliability of the BDI is also strong, typically ranging from 0.73 to 0.96, suggesting that the scale provides stable results over time.^[15]

Procedure

Paramedical students of all genders were invited to participate in the study after providing digital informed consent. The data was collected using a structured Google Form, which consisted of three sections. The first section included the consent form, the second gathered demographic information such as age, gender, academic year, and course of study, and the third contained 15 questions-five assessing stress, five evaluating anxiety, and five measuring depression.

The study was conducted among students aged 18 to 25 years from SPB Physiotherapy College and Vatsalya Nursing Institute. Each participant was individually approached, and the study's purpose and objectives were thoroughly explained before enrolment. To ensure ethical compliance, informed consent was obtained online from all participants before data collection. A total of 128 students were invited to take part in the study.

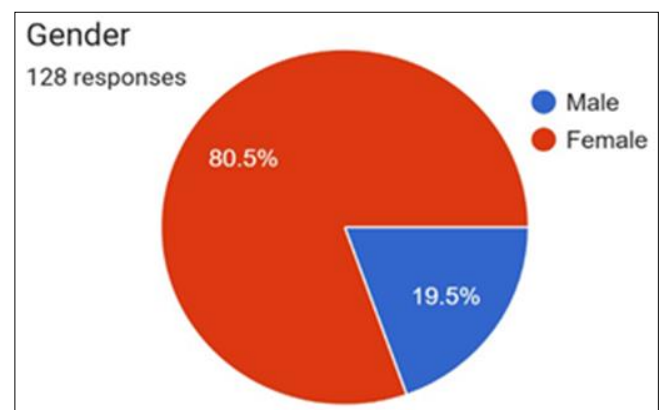
Statistical Analysis

Was done by using JAMOV1 2.3.28. Normality of data was tested by SHAPIRO-WILK TEST.As the data of gradings stress, anxiety & depression was not showing normal Distribution. So further data analysis was done by using NON-PARAMETRIC TEST. Correlation of stress, anxiety & depression was done by using spearman's correlation test. The sample size of this study was more than 50 (>100) so, the Shapiro wilk test was applied to check the normality of the data. The descriptive statistics were used to check the normality of the data. Shapiro wilk tests suggest not normal distribution ($p < 0.05$) of the data.

Corelation Analysis

As Shapiro wilk test suggest that data are not normally distributed for, validity analysis was done by non-parametric test in that the spearman's correlation test was applied to check the validity of Stress, Anxiety and Depression.

Result



Gender Distribution

There are 128 subjects included in the study in which, 25 male and 103 females were included. The mean age of the participants is approximately 21.17 years.

Table 1: Descriptive Statistics

	Stress	Anxiety	Depression
Mean	2.98	2.59	0.739
Median	3.00	2.60	0.600
Standard deviation	0.912	0.966	0.700
Shapiro-wilk w	0.979	0.971	0.884
Shapiro-wilk p	0.048	0.008	<.001

The data includes measures of stress, anxiety, and depression. Descriptive statistics shows the mean, median, standard deviation, and normality test results for each variable. Stress-The mean stress score is 2.98, with a standard deviation of 0. 912.The Shapiro-Wilk test indicates the stress scores are not normally distributed ($p < 0.048$). Anxiety and Depression-The mean anxiety score is 2.59, with a standard deviation of 0. 966.The mean depression score is 0.739, with a standard deviation of 0. 700.The Shapiro-Wilk test indicates the anxiety and depression scores are not normally distributed.

Table 2: Analysis of Correlation by Spearman's Test

		Stress	Anxiety	Depression
Stress	Spearman's rho	-		
	Df	-		
	P-value	-		
Anxiety	Spearman's rho	0.684	-	
	Df	126	-	
	P-value	<.001	-	
Depression	Spearman's rho	0.450	0.537	-
	Df	126	126	-
	P-value	<.001	<.001	-

- **Stress and Anxiety Correlation:** Moderate positive correlation (Spearman's rho = 0.684) ^[16]
- **Anxiety and Depression Correlation:** Moderate positive correlation (Spearman's rho = 0.537) ^[16]
- **Stress and Depression Correlation:** Low positive correlation (Spearman's rho = 0.450) ^[16]

The results suggest significant interrelationships between stress, anxiety and depression, with the strongest correlation observed between anxiety and depression.

Spearman's correlation test was applied to check the validity as data were not normally distributed. Table – 2 shows spearman's rho value 0.684 which suggest that there is strong positive correlation between stress and anxiety and spearman's rho value 0.537 which suggest that there is strong positive correlation between anxiety and depression.

Discussion

Paramedical students face high levels of stress, anxiety, and depression, especially before exams, which can affect their mental health and academic performance. The demanding nature of their training, along with exposure to traumatic situations, can even lead to conditions like PTSD. While sometime stress can be motivating, but too much can harm both physical and mental well-being, affecting the immune, heart, and nervous systems. Anxiety is linked to stress, can make it harder for students to focus and succeed academically. Depression among medical students represents a neglected public health problem in India. It is very important to prevent the ill effects of depression on educational attainment and career through early detection and proper interventional measures. ^[17] Also, depression is observed by persistent sadness and loss of interest, is a serious concern that needs attention. Exam stress, anxiety, and depression can put intense pressure on medical or paramedical students. Due to the difficult medical concepts and hands-on coursework, there is constant competition for academic excellence. The fear of making mistakes in clinical practices can also contribute to students' anxiety. Paramedical students frequently experience intense pressure during and before exams, which can lead to stress, anxiety, and depression. Many students in paramedical programs tend to be too busy with exams, assignments, and internships during the course of the study. They may also experience emotional difficulties during clinical rotations, particularly when dealing with difficult patient situations. The pre-exam periods are particularly challenging for paramedical students and can be stressful.

This study aims to determine the prevalence of stress, anxiety and depression in among paramedical students of south Gujarat in young adult students with age group of 18

to 25. Every subject was approached individually for the study purpose and objective of the study was explained to them. Consent form had been taken from every subject prior to the study. Total 128 subjects were approached for the study. In this study we have taken 3 scales -1. Academic Stress Scale 2. Westside Test Anxiety Scale.3. Beck's Depression Inventory, which are modified according to the before examination scenarios and psychological state.

This self-administered questionnaire was sent through Google Forms to all undergraduate students appearing for university examinations. Data from the Google Forms filled by the participants were downloaded, compiled in a Microsoft Excel spreadsheet. The data which contained responses to all questions was considered for analysis. JAMOVI VERSION 2.3.28. Software was used for statistical analysis. The results are represented as frequencies and proportions and presented in tables and graphs. All characteristics were summarized descriptively. We found a notable prevalence rate of findings from similar studies conducted in different regions our results indicates that approximately of the participants exhibited symptoms consistent with Stress, Anxiety and depression is comparable to the prevalence rates reported in studies. Research conducted by, P.S. Murthy (August2024) A study involving 80 medical students in India found that 76.2%, 80%, 72.5%, and 78.8% of them suffer from depression, anxiety, stress, and insomnia. Factors such as low self-esteem, insecurities, and failure attempts were associated with these issues. ^[18] The study highlights the need for psychological aid and counselling for these graduates, as they could help address India's physician shortage.

Dr. Pankaj Kumar (8 February 2023) conducted a study on Exam stress is a significant issue for teenagers, causing anxiety, fear, and long-lasting effects on their mental health. Teenagers are particularly susceptible to stress and anxiety due to their physical and emotional changes. Dr. Pankaj Kumar Psychiatrist emphasizes the importance of addressing exam stress early on to prevent long-term effects on mental health. ^[19]

Richard Lewis (7 July 2009) conducted the study that investigated the effectiveness of examination stress in raising psychological stress and cortisol levels. It found that an increased number of examinations and deadlines were associated with increases in all measures of stress, which is consistent with previous examination stress studies. ^[20]

The present study was conducted to evaluate preexam stress, anxiety and depression in paramedical students. This study was conducted on 128 paramedical students, out of which there were 103 females and 25 males. The results showed that there was statistically significant difference between effect of Stress, Anxiety and Depression. In our study, we've observed a significant difference in the rates of stress, anxiety and depression symptoms between female and male students our findings Indicate that female exhibited more prevalence of stress compared to that's of male as male participants. Due to more female participants in research.

In result graph-1 pie chart shows gender distribution. The mean of age group was 21. As well as the effects of stress, anxiety and depression before examination is shown in Table 1 It showed that the mean stress score is 2.98, with a standard deviation of 0.912. The mean anxiety score is 2.59, with a standard deviation of 0.966. The mean depression score is 0.739, with a standard deviation of 0.700.

In Table 2 we observed that A moderate positive correlation (Spearman's rho = 0.537) was observed between anxiety and depression and A low positive correlation (Spearman's rho = 0.450) was identified between stress and depression. The moderate correlation suggests that stress is a potential risk factor for depression, though moderate correlation suggests that stress is a potential risk factor for anxiety, specific Stress and Anxiety Correlation: Moderate positive correlation (Spearman's rho = 0.684) correlation coefficient was observed for the stress-anxiety relationship.

Interpretation correlation scale, where values between 0.50 to 0.70 indicate a moderate positive correlation and values between 0.30 to 0.50 represent a low positive correlation, our study found that anxiety and depression had a moderate correlation (Spearman's rho = 0.537). This suggests association between the two, where increased anxiety levels may contribute to depressive symptoms. In contrast, the correlation between stress and depression was lower (Spearman's rho= 0.450), indicating a low positive correlation. While stress is still a contributing factor to anxiety, its influence is comparatively more positive than that of depression. These interpretations are based on standardized correlation size guidelines, which help in understanding the strength and direction of the relationships between psychological factors.

A correlation value of 0.90 to 1.00 (or -0.90 to -1.00) is considered a very high positive or negative correlation and suggests a strong relationship. A correlation value of 0.70 to 0.90 (or -0.70 to - 0.90) is considered a high correlation; a correlation value of 0.50 to 0.70 (or -0.50 to -0.70) is considered a moderate correlation. A low correlation is defined by a correlation value of 0.30 to 0.50 (or -0.30 to - 0.50). A correlation value of 0.00 to 0.30 (or 0.00 to -0.30), indicating a very weak or no meaningful relationship between the variables. The above categories can serve as a guide when interpreting the strength and direction of associations given statistical analyses.^[16]

The findings of this study a significant relationship between pre-exam periods and feelings of stress, anxiety, and depression in paramedical students aged 18-25. The use of established and valid instruments (Academic Stress Scale, Westside Test Anxiety Scale, Beck's Depression Inventory), stress at the highest, then anxiety, and lastly depression had the lowest level. According to Spearman's correlation, there was a moderate positive correlation between stress and anxiety ($p=0.684$), and anxiety and depression ($p=0.537$) and low positive correlation between stress and depression ($p=0.450$). This means stress and anxiety go hand in hand with feelings of depression. The results from this study clearly indicate that there is an immediate need in an early psychological interventions, academic counseling, and subsequent supports to minimize the impact on mental health for paramedical students and would benefit from early intervention especially leading into pre-exam periods.

Conclusion

This study concludes that there is moderate positive correlation between Stress and Anxiety in paramedical students before examination. There is moderate positive correlation between Anxiety and Depression in paramedical students before examination. There is low positive correlation between Stress and Depression in paramedical students before examination.

Limitation of This Study

- Data cannot be generalized due to sample size.
- Only 3 factors were analyzed.
- Modified scales may affect the accuracy of standardized measurements.

Future Recommendations

- Can be done with greater sample size.
- Full, validated scales for more accurate assessment.
- In future more, factors can be included for association analysis.

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